Dearborn Group Technology

Quick Start Guide

Fiber Optic Bridge CAN System

DG-FO-BRIDGE-T System

Please read all instructions ***BEFORE applying power***

Dearborn Group Technology *is* Vehicle Networks!

- 20+ Years in of expertise in Vehicle Networks
- Automotive, Truck & Bus/Heavy Duty Vehicle Networks
- Global Footprint & Partners
- Vehicle Network:
  - Products
  - Custom Products & Solutions
  - Consulting
  - Education & Training
  - Conformance Testing

Vehicle Network Solutions

Our Vehicle Network Products

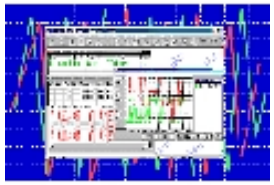
Dearborn Protocol Adapter (DPA) Series

Data Link Monitor

Gryphon 2

Gryphon S3

Gryphon Fiber Optic


Hercules

Px2

VSI-2534

VSI/VLT

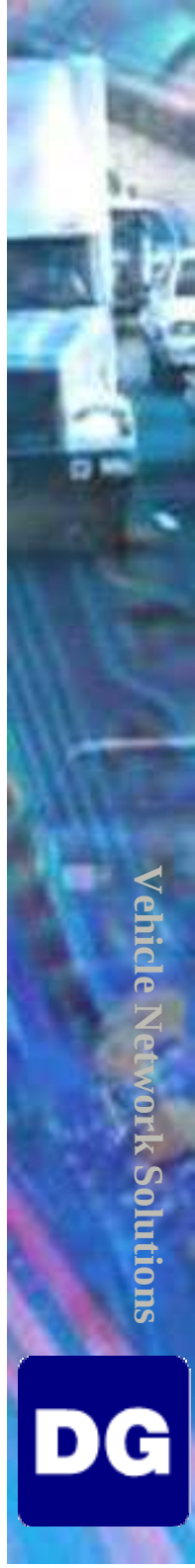
FlexRay

Protocol Mini-Module

AutoPak

DPA-on-a-Chip

- **Dearborn Protocol Adapter**
  - Truck & Bus/HD Vehicles
  - 6+ Models, DLM or OEM SW
- **Gryphon Series**
  - Automotive, Truck & Bus/HD
  - 3 Models, Hercules SW
  - Personality Cards
    - LIN, Dual-LIN, CAN, Quad-CAN
- **Px2, VSI-2534, VSI/VLT**
  - Support Automotive Vehicle Network Standards
- **FlexRay**
  - Emerging Vehicle Network Standard, 20+ Products
- **Protocol Mini-Module, AutoPak, DPA-on-a-Chip**
  - Customized Product Solutions



DG Shipping Package Contents

- The Fiber-Optic Satellite T Module should includes the following items:
  - CAN Fiber-Optic Bridge (Black box), including a 12 VDC Universal A/C power adapter
  - CAN Fiber-Optic Satellite Module (nine-volt batteries not included)
  - Two fiber-optic cables with SMA connectors (10 meters in length)
  - CD with the user Manual for the Fiber-Optic Bridge

- If you discover that you are missing any part of this package, please contact your Dearborn Group sales representative or the technical support hotline at once.

http://www.dgtech.com/support/support_guide.html

Fiber-Optic Bridge Functions

- The Fiber-Optic Bridge consists of two major components:
  1. The Fiber-Optic Bridge Adapter
  2. The Fiber-Optic Satellite Module.

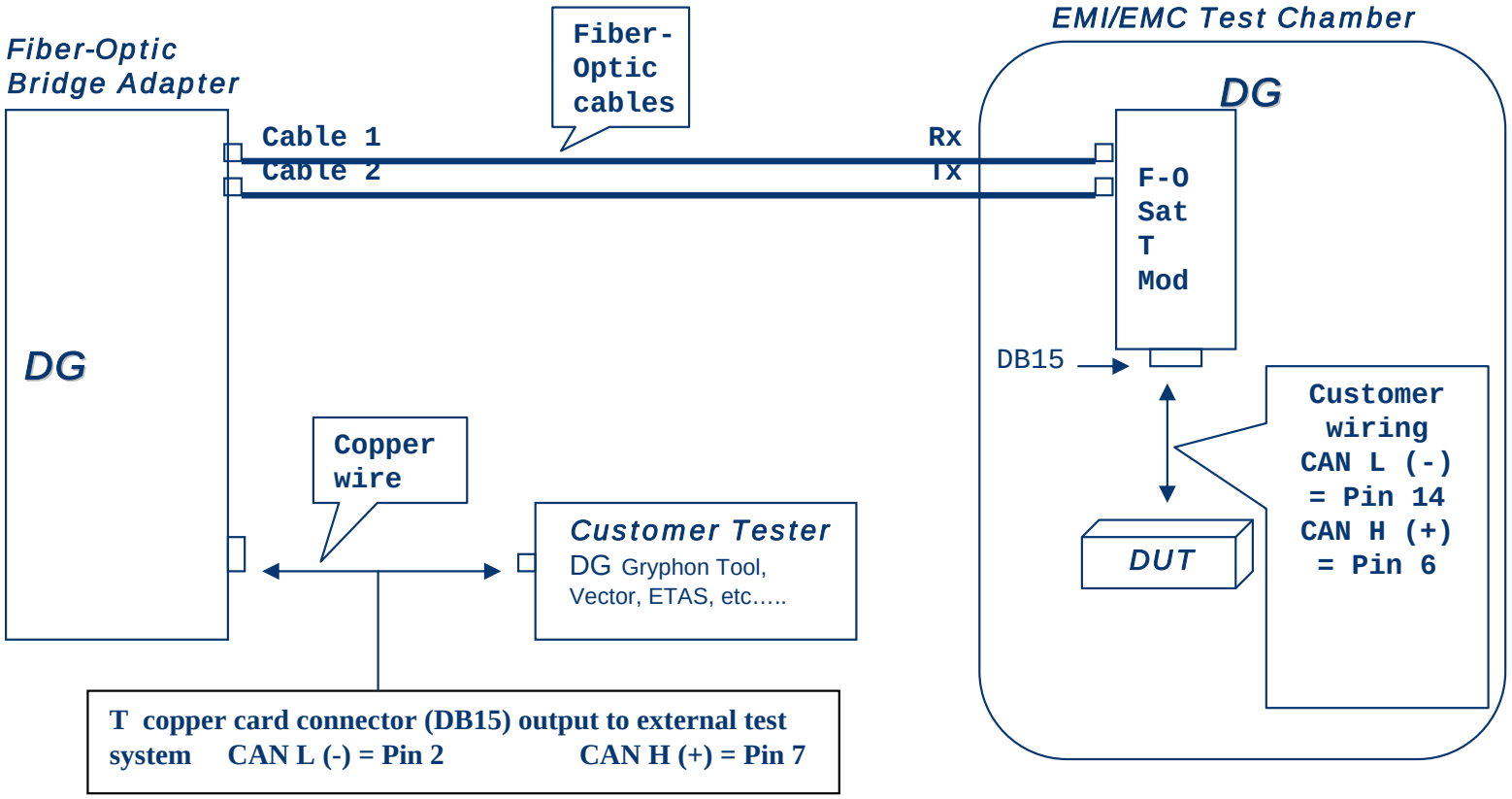
- The Bridge Adapter works as a pass-through hardware device. It translates the vehicle network electrical signals from the GRYPHON® tool (or a user's host test device) into fiber-optic signals.

- These fiber-optic signals are used to interface with the Satellite Module placed in the EMC Test Chamber. The fiber-optic signals are then translated back into vehicle network electrical signals by the Satellite Module and used to communicate with the DUT.

Fiber-Optic T Bridge Example

Bridge Adapter/Gateway connection example using:

- **Bridge Adapter (Black Box)**
- **Fiber Optic Satellite "T" module**


Fiber-Optic Bridge Adapter
DG
Fiber-Optic cables
Cable 1
Cable 2
Rx
Tx
EMI/EMC Test Chamber
DG
F-O Sat T Mod
DB15
Customer wiring CAN L (-) = Pin 14 CAN H (+) = Pin 6
DUT
Copper wire
Customer Tester
DG Gryphon Tool, Vector, ETAS, etc.....
T copper card connector (DB15) output to external test system CAN L (-) = Pin 2 CAN H (+) = Pin 7

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CAN Fiber Optic Bridge

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Pin Assignment Warning

CAUTION

- Make only the connections to the DB 15 and DB 9 connectors as indicated in the instructions. Other pins contain signals and voltages and any connection made to them could cause damage to the hardware voiding the warranty.

Fiber-Optic Cables/Wiring Pin Assignments

Gryph Copper Card To Customer Tester	FO cables from the Bridge to the Satellite	Satellite Connector (DB 15) to the DUT (wired)
Pin 2 to CAN L (-) Pin 7 to CAN H (+)	Cable 1 to Rx (Cable 1) Cable 2 to Tx (Cable 2)	Pin 14 to CAN L (-) Pin 6 to CAN H (+)

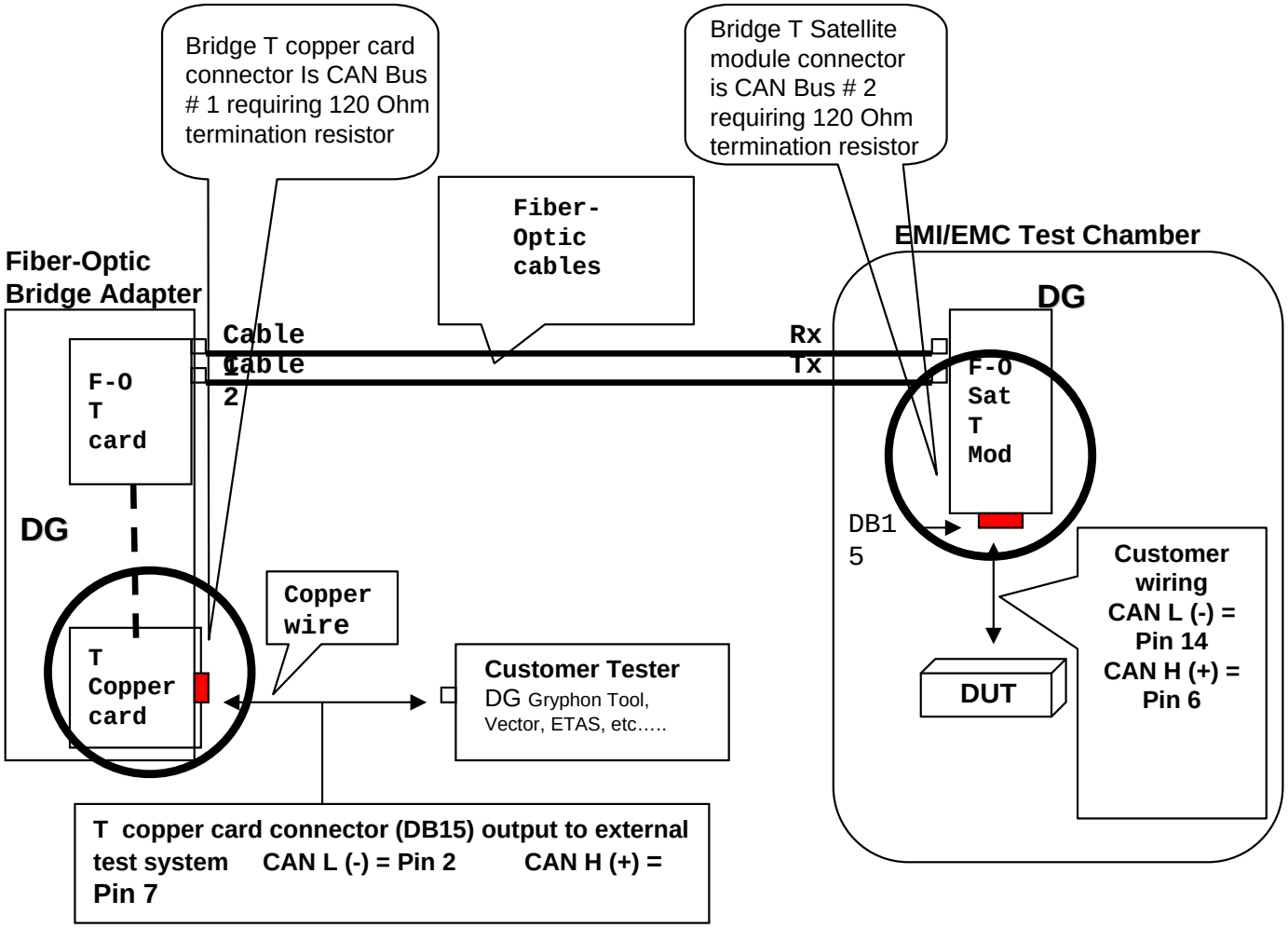
- Note: When connecting the fiber-optic cables, always connect Cable 1 from the Bridge to Rx (Cable 1) on the Satellite, and Cable 2 from the Bridge to Tx (Cable 2) on the Satellite.
- *Caution: Making a connection to any of the other pins of the DB 9 or DB15 connector could result in damage to the equipment.*

CAN Termination Resistor

- Remember, every CAN bus needs to be terminated at BOTH ends.
  - The FO Bridge is ONE CAN bus.
  - The FO Satellite is the SECOND CAN bus.

- First, connect the Bridge unit to your tester.
  - On the BRIDGE unit, CAN HI is Pin 7 and CAN Low is Pin 2.
  - You need to have a 120 ohm resistor across CAN HI & CAN Low.
  - Your tester will also need a 120 ohm resistor across CAN HI & CAN Low, unless it has a built in, or software selectable internal terminating resistor.

Termination Resistor


Bridge T copper card connector Is CAN Bus # 1 requiring 120 Ohm termination resistor
Bridge T Satellite module connector is CAN Bus # 2 requiring 120 Ohm termination resistor
Fiber-Optic cables
EMI/EMC Test Chamber
Fiber-Optic Bridge Adapter
DG
Cable 1
Cable 2
Rx
Tx
F-O T card
F-O Sat T Mod
DG
DB15
Copper wire
T Copper card
Customer Tester
DG Gryphon Tool, Vector, ETAS, etc.....
DUT
Customer wiring
CAN L (-) = Pin 14
CAN H (+) = Pin 6
T copper card connector (DB15) output to external test system CAN L (-) = Pin 2 CAN H (+) = Pin 7

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Checking for the CAN 120 Ohm Termination Resistor Presence

- How do I check my test system to determine if it already has a 120 Ohm termination resistor?

- Procedure:
  - Put an Ohmmeter across CAN HI & Low pins.
  - If you see a resistance of 120 ohms, it is terminated.
  - If not, you will need to solder one in.
  - If both ends are terminated, you will see a resistance of 60 ohms.

T System Bridge Module

- IMPORTANT NOTE: When connecting the fiber-optic cables, always connect Cable 1 from the Bridge to Rx (Cable 1) on the Satellite, and Cable 2 from the Bridge to Tx (Cable 2) on the Satellite Module.)

- Power switch for the bridge
  - This switch is used to apply/disconnect power to the CAN Fiber-Optic Bridge.
  - Power to the unit is applied when the switch is placed in the “up” position.

- Power jack
  - This standard 2.5 mm x 5.5 mm connector (with positive center pin) is used to provide power to the Fiber-Optic Bridge.
  - This power jack is designed to accept an input range between 8 to 18 VDC. The typical operating voltage supplied by the included Universal Power Adapter is approximately 12 VDC.

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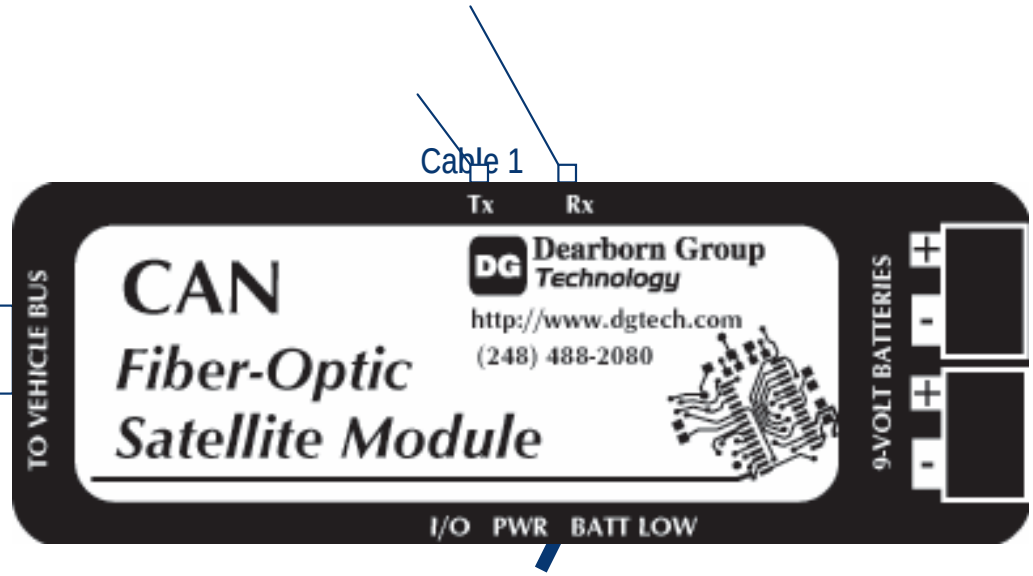
Fiber-Optic Satellite T Module

- The CAN Fiber-Optic Satellite Module is normally placed inside of the test chamber.
- It can be used for tests performed outside the chamber as well.
- The Figure below shows the CAN Fiber-Optic Satellite T Module.



Pin 14 = CAN L (-)
Pin 6 = CAN H (+)

Switch shown in the ON position (left)

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T System Satellite Module

- Pin assignments: The DUT (Device Under Test) is connected to the Satellite module, using pin 14 for CAN L (-) signal, pin 6 for CAN H (+).

DO NOT CONNECT ANY OTHER PINS!

- Power Switch
  - This switch (marked I/O PWR on the unit) is used to turn power on or off to the CAN Satellite Module. Power is applied to the unit when the switch is moved to the left (I).
- Power to Satellite Module
  - Power is supplied to the Fiber-Optic Satellite Module via two internal nine-volt batteries and may be turned on or off via the toggle switch.
- Battery compartment
  - The Fiber-Optic Satellite Module is powered by two nine-volt batteries inserted into the battery compartment and connected as indicated on the label of the module. The cover lid over the batteries is designed to fit tightly and hold them in place.

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Power On and Battery Low Indicators for Satellite Module

- Power On LED
  - This LED (closest to the power switch) will be turned on when battery power is switched on.
  - It remains on momentarily and then turns off.

- Battery Low LED
  - This LED (farthest from the power switch) will NOT be illuminated during operation unless there is a low battery condition, in which case the LED will be turned on (Red).
  - When this LED is illuminated, it indicates that the enclosed batteries are not providing sufficient power for the proper operation of the module and the batteries should be replaced.
  - Note: Do not attempt to run further tests until the batteries have been replaced.

Bridge Fuse

- If the Bridge module is dead, check the fuse to see if it has opened the circuit. It is located on the top circuit board in a fuse socket near the ON/OFF switch.

- The fuse in the bridge is a pretty common type. Littlefuse sells the product under the 'Nanofuse' name. The fuse in the bridge is a slow-blow 1.5A fuse; Digikey part number F2601. Other companies sell compatible fuses.

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Fiber Optic Cables

- Fiber Optic Cable Specs
  - 100/140 Micro multimode fiber optic cable with SMA905 connectors

- The fiber optic cables contain glass tubes for signal transmission. They are easy to break if bent too far.

  DO NOT exceed 25mm bend radius

- A quick and easy test of the cable is to shine a light down one end of the cable. If the slightly bent cable transmits that light out the other end, it is not damaged.

Fiber Optic Satellite Module Isolation

- The FO SAT Modules need to be isolated by 50mm. This applies to all satellite modules and is not specific to DG's.
- The reason is the bypass caps typically are placed inside the fiber optic satellite modules from inputs to the Printed Circuit Board/Chassis.
- If the case of the fiber optic module:
  - IS placed directly on the ground plane
  - AND there are bypass caps inside the satellite module from input to chassis
  - Then there is an additional RF path provided to travel.
- This can cause different behavior and this is what is being avoided by isolating the fiber optic module by 50mm insulation above the ground plane.

Dearborn Group Headquarters
Vehicle Networks - Farmington Hills, MI

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- Consulting
- Vehicle Network Education
- Sales & Marketing
- Product Shipping

- Development & Engineering
- Automotive Vehicles
- Specialized Vehicle Applications
  - Customized Solutions
  - Military Applications
  - Many More

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Heavy-Duty Truck & Bus Design Center Vehicle Networks - Indianapolis, IN

- Development & Engineering
- Heavy Duty Vehicles
  - Truck & Bus
  - Construction Vehicles
  - Agricultural Vehicles
  - Many other applications

- Technical Support
- Sales
- Heavy-Duty Vehicle Network Education

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DG's Global Locations

Vehicle Network Solutions

International Distributors

TZM FlexPower for your solutions

KMData 케이엠데이터

Snap-on

MAC TOOLS

TECNOTALLERES

Microport

DE Dearborn Electronics Innovative Technology Solutions

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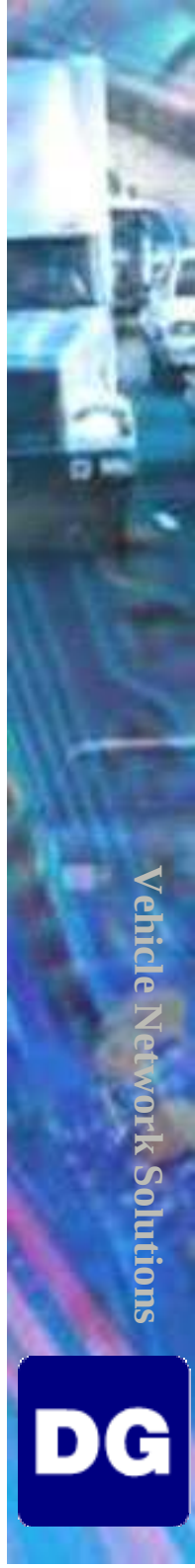
RA CONSULTING



Partnerships & Alliances

- Partnerships

TZM FlexPower for your solutions

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C&S

Lectronix

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- Alliances

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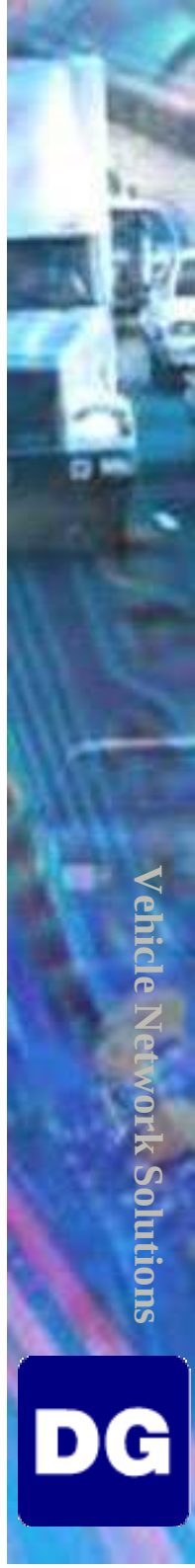
montavista

NATIONAL INSTRUMENTS

YOKOGAWA



Contact Information

- www.dgtech.com
- Dearborn Group Headquarters
  27007 Hills Tech Court
  Farmington Hills, MI 48331
  (248) 488-2080
  (248) 488-2082 fax
- Dearborn Group Heavy-Duty Truck & Bus Division
  2415 Directors Row Suite G
  Indianapolis, IN 46241
  (317) 248-9332
  (317) 248-1504 fax